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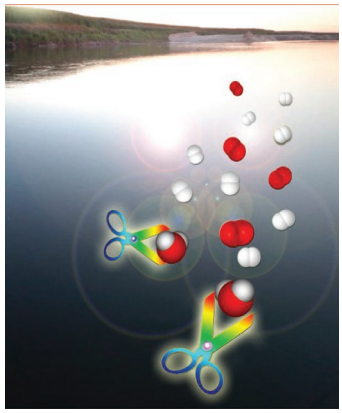
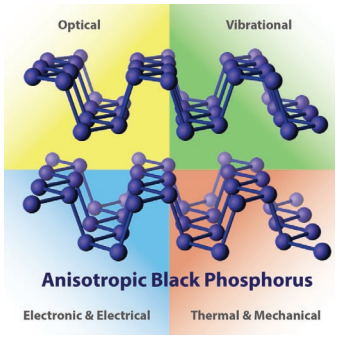


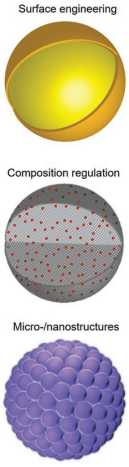
Electrocatalysts

Recent progress regarding earth-abundant heterogeneous electrocatalysts as substitutes for photoelectrochemical water splitting is reviewed by Xinliang Feng and co-workers in article number 1700090. Composition/structure–activity relationships are highlighted, and perspectives on challenges and opportunities for enhancing photoelectrochemical water-splitting performance are discussed.

Black Phosphorus

The experimental methods that can potentially characterize the structural, optical, vibrational, electronic, thermal, and mechanical anisotropic properties of black phosphorus are evaluated by Mark C. Hersam and co-workers in article number 1700043. The characterization techniques and principles that have been developed and applied to anisotropy in black phosphorus will undoubtedly be beneficial for further studies of other anisotropic 2D nanomaterials in the future.





Rechargeable Batteries

Stabilization methods for nanostructured electrode materials can improve the performance and indicate fundamental nanomaterial design principles for advanced rechargeable batteries and are thus key techniques for the development of high-performance rechargeable batteries. Ya-Xia Yin, Yu-Guo Guo and co-workers summarize such methods in terms of surface engineering, composition regulation, and micro-/nanostructures in article number 1700094.

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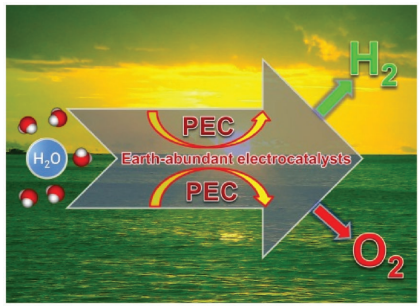
REVIEWS

Electrocatalysts

Y. Hou, X. D. Zhuang, X. L. Feng* 1700090

Recent Advances in Earth-Abundant Heterogeneous Electrocatalysts for Photoelectrochemical Water Splitting

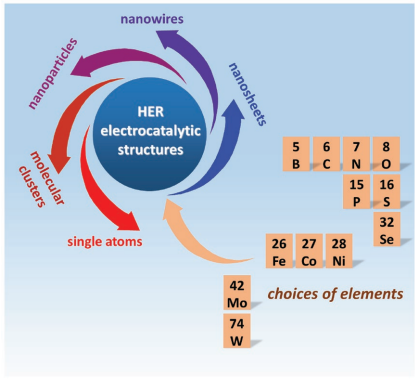


Water electrolysis is an efficient and attractive strategy to obtain hydrogen fuels and oxygen with high purity. Recent progress regarding earth-abundant heterogeneous electrocatalysts as substitutes for precious-metal-based catalysts in photoelectrochemical water splitting is reviewed. Composition/structure–activity relationships are highlighted, and perspectives on challenges and opportunities for enhancing the photoelectrochemical water-splitting performance are discussed.

Electrocatalysts

J. Wang, H. Zhang, X. Wang* ... 1700118

Recent Methods for the Synthesis of Noble-Metal-Free Hydrogen-Evolution Electrocatalysts: From Nanoscale to Sub-nanoscale



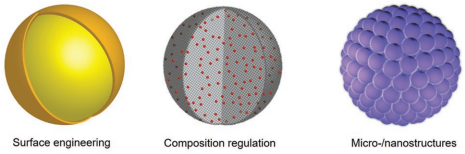
Recent advances in the synthesis of electrocatalytic structures toward the hydrogen-evolution reaction, including non-precious-metal nanostructures, molecular clusters, and single-atomic or molecular catalysts are highlighted. The central strategy to achieve high electrocatalytic activity is discussed; namely, maximizing the utilization efficiency of all active sites through downsizing and merging the gap between homogeneous and heterogeneous catalysis.

Rechargeable Batteries

N.-W. Li, Y.-X. Yin,* S. Xin, J.-Y. Li, Y.-G. Guo* 1700094

Methods for the Stabilization of Nanostructured Electrode Materials for Advanced Rechargeable Batteries

The methods for stabilization of nanostructured electrode materials are key techniques for the development of high-performance nanostructured materials for advanced rechargeable batteries. These stabilization methods can improve the performance and indicate fundamental nanomaterial design principles for advanced rechargeable batteries.



Lithium-Ion Batteries

J. A. Lochala, H. Zhang, Y. Wang, O. Okolo, X. Li,* J. Xiao* 1700099

Practical Challenges in Employing Graphene for Lithium-Ion Batteries and Beyond

The practical challenges of incorporating graphene in lithium-ion batteries and beyond are discussed. The scientific gap between graphene research and the key parameters in individual battery technologies is discussed for meaningful evaluation and application of graphene in energy storage.

REVIEW

Two-dimensional (2D) black phosphorus (BP) displays high in-plane anisotropy, which distinguishes it from other 2D materials. The experimental methods that can potentially characterize the structural, optical, vibrational, electronic, thermal, and mechanical anisotropic properties of BP are evaluated. As the prototypical anisotropic 2D material, the results pertaining to BP can likely be generalized to related anisotropic 2D materials in the future.

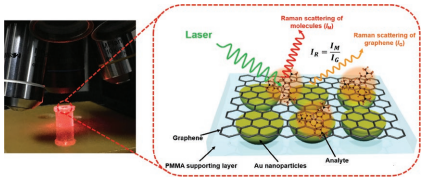
Black Phosphorus

X. Liu, C. R. Ryder, S. A. Wells, M. C. Hersam* 1700143

Resolving the In-Plane Anisotropic Properties of Black Phosphorus

FULL PAPERS

In situ Raman quantitative analysis is realized by using a graphene-based, flexible, and transparent substrate for graphene-based surface-enhanced Raman spectroscopy (G-SERS). Quantification of dye molecules in aqueous solution is studied. The real-time, in situ monitoring of the release process of rhodamine B (RhB) molecules, which mimics practical applications, is investigated by using the G-SERS substrate.

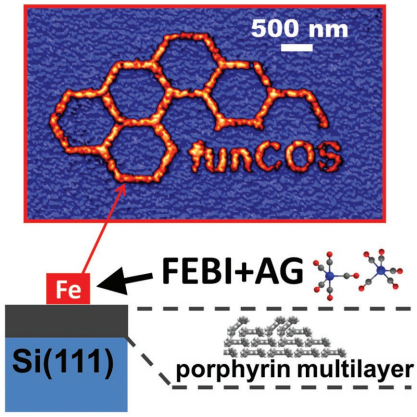


Raman Spectroscopy

H. Tian, N. Zhang, L. Tong,* J. Zhang* 1700126

In Situ Quantitative Graphene-Based Surface-Enhanced Raman Spectroscopy

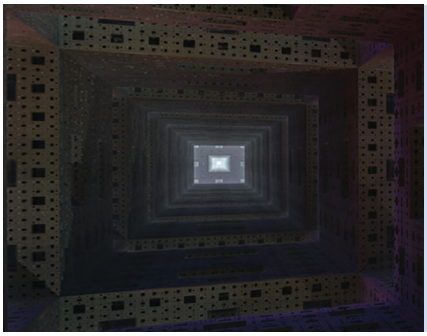
Hybrid nanostructures are lithographically fabricated via focused electron beam induced processing combined with catalytic growth processes. A focused electron beam is used as a "pen" to write the funCOS logo with the precursor $Fe(CO)_5$ as "ink." In a subsequent step, the structure is further "developed" by autocatalytic growth of the already deposited Fe material by prolonged dosage of the precursor.



Nanostructure Fabrication

M. Drost, F. Tu, F. Vollnhals, I. Szenti, J. Kiss, H. Marbach* 1700095

On the Principles of Tweaking Nanostructure Fabrication via Focused Electron Beam Induced Processing Combined with Catalytic Growth Processes



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